

***Tricyrtis chinensis* Hir. Takah. (Liliaceae), A New Species from Southeast China**

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Chinese plants previously identified as *Tricyrtis macropoda* Miq. are distinct from Japanese plants of that species in several characteristics. We therefore recognize them as a new species, *Tricyrtis chinensis*, and provide a key to the species of the section *Tricyrtis*, to which the new species is assigned.

Key words: China, Liliaceae, new species, *Tricyrtis chinensis*, *Tricyrtis macropoda*

Tricyrtis macropoda Miq. (Liliaceae) was described based on specimens from Japan. Takahashi (1980, 1987) and treatments in nearly all Chinese floras (e.g., Tsi 1980, Lin 1993, Chen & Takahashi 2000) considered the species to occur also in southeast China. We recently had the opportunity to observe the Chinese plants in the field in southeast China and found them to be distinct from *T. macropoda*. We therefore recognize these plants as representing a new species of *Tricyrtis*, which we describe below.

***Tricyrtis chinensis* Hir. Takah. sp. nov.**

Affinis *Tricyrtis macropodae*, sed rhizomate annuali et floribus pluries flava divesus.

Typus. China. Zhejiang Province, Ankou, 420 m (H. Takahashi 20201, holotypus in SHM, isotypus in GIFU [Herbarium of Gifu University], KUN, KYO, TI, TNS)

Herbs with 1 or 2 short underground stolons. Roots with orange anthraquinoid

pigments. Stem erect, simple, solitary, scarcely flexuous, 50-150(-200) cm long, setose with obliquely downward-pointing short setae. Leaves elliptic to obovate, (6-)10-20 cm long, (3-)5-8 cm wide, base rounded to cordate, apex acuminate to cuspidate, sessile or amplexicaul, both surface setose, margin entire setose, with 7-9 clearly marked main veins. Inflorescence terminal or sometimes also axillary in large individuals, cymose, with 2 or 3 branchings, pedunculate; peduncle 3-10(-15) cm long, with 0 or 1 bract; pedicel 12-20(-25) mm long; peduncle and pedicel hispid to setose, often with long glandular hairs. Flowers (1-)2-5(-7) in each cyme. Perianth recurved 1/3 from base; tepals white to yellow with small purple spots on adaxial surface; outer tepals narrowly elliptic, 16-20 mm long, 5-7 mm wide, base auriculate saccate and conspicuously foveolate, apex acuminate, abaxial surface with long thin glandular and short non-glandular hairs; inner tepals lanceolate, 15-19 mm long, 2-4 mm wide at mid point, 5-7 mm wide at lower widest part,

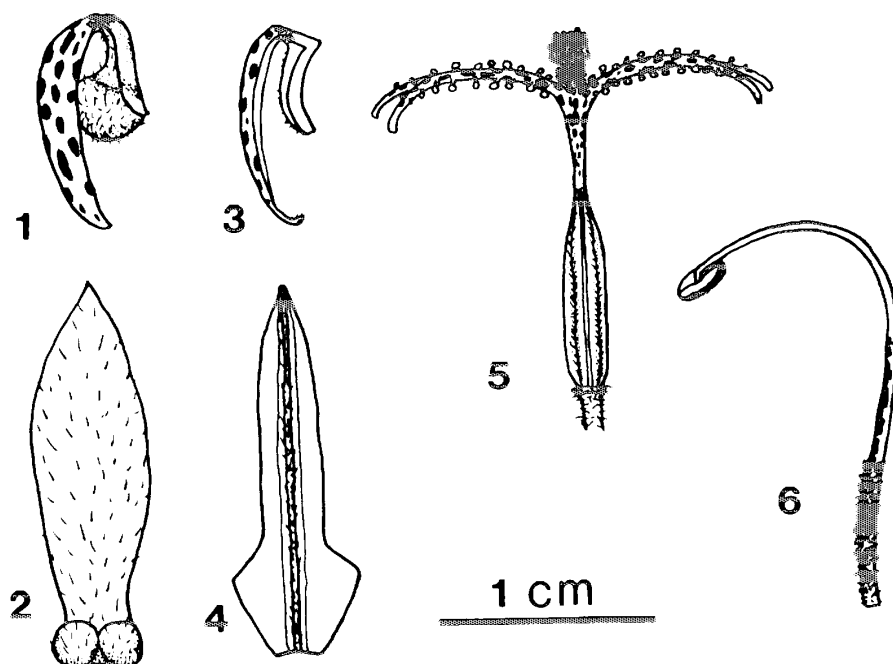
base hastate, apex acuminate, midrib of abaxial surface with long thin glandular and short non-glandular hairs. Stamens 6; filaments recurved in upper part, with rather dense hairs on lower 1/3, with reddish purple spots on middle part, 18-22 mm long; anthers white or purplish, 3 mm long. Ovary glabrous, narrowly oblong, trigonous, 9-11 mm long, 2 mm wide; style trifid, branches recurved-patent, deeply cut, with

small purple spots and glandular protuberances on branches. Capsule trigonous, glabrous, septicidally dehiscent.

Tricyrtis chinensis has been identified as *T. macropoda* by nearly all botanists. The former species, however, can be characterized by rather many features (Table 1). The most distinct feature of *T. chinensis* is the annual rhizome,

TABLE 1. Comparison of some characters in *Tricyrtis chinensis* and *T. macropoda*

Character	<i>T. chinensis</i>	<i>T. macropoda</i>
Rhizome	annual	perennial
Anthraquinoid pigments in root	weak	pronounced
Stem height	often more than 1.5 m	usually less than 1 m
Leaf size	(6-)10-20 × (3-) 5-8 cm	8-15 × 3-5 cm
Flower number	many, sometimes more than 50	less than 20
Ground color of tepals	white or yellow	white
Reddish purple spots on filaments	always distinct	present or not
Orientation of tepal apex	downward or inward, rarely outward	outward
Width of inner tepal at mid point	2-4 mm	4-5 mm



FIGS. 1-6. Floral parts of *Tricyrtis chinensis*. 1. Side view of outer tepal. 2. Abaxial view of extended outer-tepal. 3. Side view of inner tepal. 4. Abaxial view of extended inner-tepal. 5. Pistil. 6. Stamen. Bar = 1 cm.

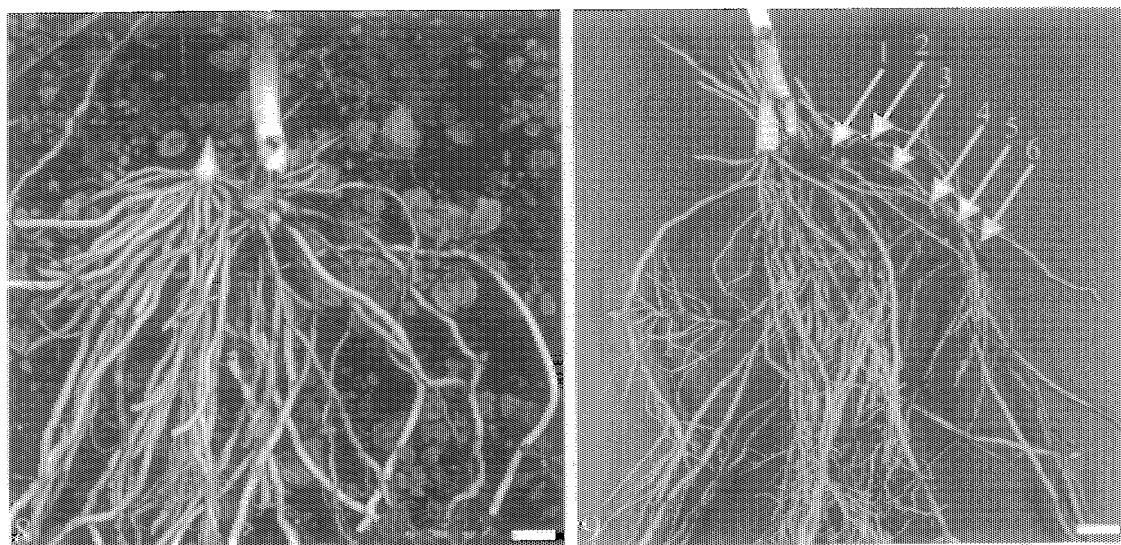
which decays by the following growing season (Fig. 8). The rhizome of *T. macropoda* is perennial and survives for at least one year, and usually several years, and retains the old roots which appear to function as storage organs (Fig. 9). *Tricyrtis chinensis* produces one bud, or sometimes two buds on large plants, on the distal end of the short rhizomes that develops into a new shoot the following year. Only the new roots produced under the buds, which appear in greater number than in *T. macropoda*, appear to be storage organs. *Tricyrtis*

macropoda seldom produces more than one new bud. Although *T. chinensis* has orange anthraquinoid pigments in the roots, the pigments are less concentrated than in *T. macropoda*.

Tricyrtis chinensis are larger than *T. macropoda* in general. In *T. chinensis* the main shoot often grows to 1.5 m or more, the leaves range from (6-)10-20 × (3-)5-8 cm and large plants can produce as many as 50 or more flowers under suitable conditions (Fig. 7). In *T. macropoda* the shoots are usually less than 1 m



FIG. 7. Habit of *Tricyrtis chinensis* at Tianmu-shan. Bar = 10 cm.



FIGS. 8 and 9. Underground parts of *Tricyrtis chinensis* (8) and *T. macropoda* (9). Arrows in Fig. 9 point to scars of old stems which were produced one, two, three, four, five and six years ago. Bar = 1 cm.



FIGS. 10-18. Flowers of *Tricyrtis chinensis* (10-15) and *T. macropoda* (16-18). 10 and 11: Tianmu-shan, Lin-an County, Zhejiang Province. 12 and 13: Ankou, Suichang County, Zhejiang Province. 14: Wulingkeng, Qingyuan County, Zhejiang Province. 15: Yu Jia Yuan, Yanshan County, Jiangxi Province. 16: Akechi, Ena-gun, Gifu Prefecture. 17: Kanayama, Mashita-gun, Gifu Prefecture. 18: Kaize, Minamisaku-gun, Nagano Prefecture. Bar = 1 cm.

tall and rarely over 1.5 m, the leaves range from 8-15 × 3-5 cm and there are usually less than 20 flowers per plant under good conditions.

The ground color of the flowers varies from white to yellow in *Tricyrtis chinensis*, whereas only white in *T. macropoda*. In some populations, such as at Tianmu-shan all flowers had a white ground color; those at Wuyi-shan were yellow. Some other populations had plants with white, pale yellow or yellow flowers. Reddish purple spots on the middle of the

filaments are always distinct in *Tricyrtis chinensis* whereas spots do not always occur on the filaments in *T. macropoda* (Figs. 16-18). The inverted part of the tepals is usually outwardly rounded and the apex extends downward or inward (Figs. 10 and 12-15) and only sometimes does the apex extends outward (Fig. 11) in *T. chinensis*, whereas the inverted part is somewhat indented and the apex always extends outward in *T. macropoda* (Figs. 16-18). The inner tepals of *T. chinensis* are narrower at

the middle (2-4 mm) compared with *T. macropoda* (4-5 mm).

Japanese name. Ohyama-hototogisu

Specimens examined. **Anhui Province:** Jiuhua-shan, *Huadong Working Team 5812* (SHM); Taidayin Gongshe Xin-nong Dadai - Shuanghekou, *anon. 8410* (SHM). **Fujian Province:** Sangang, 800 m, *S. Wang 13019, 13032* (SHM); Mogan-shan, *S. W. Kang 109* (TI). **Guangdong Province:** Ruyuan, Daqiao, *X. Gao 52801* (KUN); Yangshan Xian, 900 m, *L. Deng 1333* (KUN); Heping Xian, *Z. Wei 120269* (KUN); Shixing Xian, 580 m, *X. Wang et al. 464* (TI); Lokchong (Lechang), *C. L. Tso s. n., June 18, 1929* (TI); Luofu-shan, *N. Chen 41393* (KUN). **Guangxi Province:** Guanyang Xian, *Z. Chen 52404, 52423* (KUN). **Hunan Province:** Nan, *W. Hsia 318* (TI). **Jiangxi Province:** Yanshan County, Yu Jia Yuan in Wuyi-shan Nature Reservation, 920-1000 m, *H. Takahashi 15580* (GIFU), around Ye Jia Chan in Wuyi-shan Nature Reservation, 920-1000 m, *H. Takahashi 15598* (GIFU, KUN, SHM, TNS); Shangrao Xian, Wufu-shan, 700 m, *M. Nie et Q. Lai 4715* (KUN), 800 m, *M. Nie et Q. Lai 4791* (KUN, SHM), 900 m, *Q. Lai et M. Nie 4983* (KUN); Yezhonglu, *M. Nie 6612* (SHM); Nankang Xian 760 m, *M. Nie et al. 9917* (SHM); Yushan County, Ti Yun Lin, Sanquin-shan, 1080 m, *H. Takahashi 15616* (GIFU, TNS), 1350-1450 m, *H. Takahashi 15614* (GIFU, SHM, TNS), 15709 (GIFU); Lushan, 1100 m, *anon. 06291* (SHM); Lushan, *M. Takahashi 132* (TI), *s. n., Sep. 1941* (TNS); Lushan, *Jieling, N. Fujita s. n., Sep. 28, 1943* (TI); Lushan, *Liu s. n.* (KYO); Uning Xian, 800 m, *Q. Lai 3034* (KUN); Fengcheng, Talou-shan, 995 m, *Y. Tsiang 10344* (TI); near Satiukong, Yungshiu, 800 m, *Y. Tsiang 10608* (TI); Huanglong, 880 m, *M. Nie 07632* (KUN); Xiushui Xian, Huangshagang, 800 m, *Q. Lai 3385* (KUN); Sichuan, Lizhou, 700 m, *J. Yue 4032* (KUN); Ningdu, Wufangxiang, *anon.*

5503 (KUN); Shicheng Xian, *anon. 4505, 4715* (KUN); Dexing Xian, Damao-shan, *Q. Lai et M. Nie 05431* (KUN); Guangfeng, *M. Nie et Q. Lai 5879* (KUN); Wuyi-shan, 1150 m, *Q. Lai et M. Nie 4344* (KUN). **Zhejiang Province:** Hangzhou, Ziyungan, *anon. 05556* (SHM); Hangzhou, Beigao-feng, *L. Lu 1118* (SHM); Hangzhou, Yunqi, *L. Lu 1272* (SHM); Hangzhou, Genshanmen, *anon. s. n., Aug. 1909* (TNS); Hangzhou, Gushan, *K. Honda 26, 474* (TI); Hangzhou, *Kimura s. n. Oct. 24, 1933* (KYO); Tian Tai Shan, 850 m alt., *L. Qiu 01919* (SHM); Tianmu-shan, *B. Geng et T. Hong 130* (KUN); Longquan, *Dan 5679* (KUN); Lin-an County, Tianmu-shan, 1100 m, *H. Takahashi 20207* (GIFU, TNS), 1000 m *H. Takahashi 20235* (GIFU, SHM, TNS), 700 m, *H. Takahashi 20246* (GIFU, SHM, TNS), 500 m, *H. Takahashi 20271* (GIFU, KUN, KYO, SHM, TNS); Qingyuan County, Wulingkeng, 500 m, *H. Takahashi 20467* (GIFU, TNS).

Tricyrtis chinensis is obviously closely related to *T. macropoda*, which is placed in section *Tricyrtis* (Takahashi, 1980). A key to the species of section *Tricyrtis*, including *T. chinensis*, presented below.

1. Roots with anthraquinoid orange pigments
 2. Perianth spreading obliquely upward *T. suzukii*
 2. Perianth patent or recurved
 3. Perianth patent *T. setouchiensis*
 3. Perianth recurved
 4. Rhizome perennial; anthraquinoid pigments pronounced; ground color of perianth white; inner tepals 4-5 mm wide at middle *T. macropoda*
 4. Rhizome annual; anthraquinoid pigments weak; ground color of perianth white or yellow; inner tepals 2-4 mm wide at middle .. *T. chinensis*

1. Roots without anthraquinoid pigments
2. Perianth spreading obliquely upward;
ground color yellow *T. latifolia*
2. Perianth patent
3. Ground color of perianth white
..... *T. affinis*
3. Ground color of perianth greenish white
4. Stem and leaves pubescent;
inflorescence with few flowers
..... *T. pilosa*
4. Stem and leaves nearly glabrous;
inflorescence with many flowers
..... *T. viridula*

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